NORTHCENTRAL UNIVERSITY
ASSIGNMENT COVER SHEET

Student: **Michael Higley-Vance**

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EDU7006-8 **Dr. Rebecca Watts**

Quantitative Research Design **Activity #5a: Explore Quasi-Experimental Designs**

Comments:

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~~<Faculty comments here>~~Michael, thanks for submitting this part of activity 5. You did very well in responding to the questions. The major considerations when designing a research study involve the threats to internal validity. You want there to be some validity with regard to the inferences that you make based on the research results. We can never remove all threats to the validity. There will always be some limitations to our research. These limitations arise due to the threats to validity. So, in our research, we want to reduce these threats as much as possible. For example, the threat of testing is a major threat to the

validity when there are multiple tests given to participants. These threats are reduced when there is more time between the two testing periods because individuals are less likely to become familiar with a test when there is more time between the testing periods. So, if we use this type of design, we should allow for sufficient time between the two testing periods. In a similar fashion, we can take any of the threats to internal validity and design research study such to minimize these threats. If we do not minimize the threats, the inferences that we make and perhaps the policy that we create are limited based on the validity limitations from these threats. Thus, we have a limited understanding of reality when we do not control for the threats to validity.

Score = 100

Dr. Watts

<Faculty Name> <Grade Earned> <Writing Score> <Date Graded>

Numerical Points	Letter Grade	Descriptor	Explanation
100 - 94	A	Excellent	Completes all required parts of the assignment, demonstrates deep understanding of materials, uses very clear and effective expression appropriate to scholarly writing, and has very few or no errors in grammar, mechanics, and APA formatting.
93-90	A-		
89-87	B+	Good	Completes all or most required parts of the assignment, demonstrates good understanding of readings, uses mostly clear and effective expression appropriate to scholarly writing, and has few errors in grammar, mechanics, and APA formatting.
86-83	B		
82-80	B-	Fair	Completes most required parts of the assignment, demonstrates some understanding of readings, and writing is somewhat clear, effective , and scholarly, and has some errors in grammar, mechanics, and APA formatting.
79-77	C+		
76-73	C	Poor	Completes some required parts of the assignment, demonstrates some understanding of readings, and writing is difficult to understand and unscholarly

			and has **several** errors in grammar, mechanics, and APA formatting.
72-0	**F**	**Unacceptable**	Completes **few** required parts of the assignment, demonstrates **little** understanding of readings, and writing is **difficult to understand** and **unscholarly** and has **many** errors in grammar, mechanics, and APA formatting.

Explore Quasi-Experimental Designs: Activity 1

1. Jackson (2012), even-numbered chapter exercises, p 360.

    - Question 2. A psychology professor is interested in whether implementing weekly quizzes improves student learning. She decides to use the weekly quizzes in one section of her introductory psychology class and not to use them in another section of the same course. Which type of quasi-experimental design do you recommend for this study? This type of quasi-experimental design would be a nonequivalent control group posttest-only design.

    - Question 4. Identify some possible confounds in each of the studies you outlined in your answers to exercises 2 and 3. In a nonequivalent control group posttest-only design, researchers would not be able to conclude that the implementation of weekly quizzes definitely caused any of the observed changes in student grades. Additionally, results from this experiment cannot be contributed solely to the manipulation of the quizzes and therefore, lacks internal validity. Diffusion of treatment could be one threat to internal validity because the experiment group could share quiz information with the control group thereby causing data to be skewed. Another threat is perhaps that of testing.

    - Question 6. Give three reasons a researcher might choose to use a single-case design. A researcher might use a single-case design when the study involves only one group, the experiment group. Another reason a researcher might choose to use a single-case design might be to rule out alternative explanations for the treatment results. Hmmm…there are other and better alternatives for achieving this purpose than that of the single case design. A third reason why a single-case design might be useful could be the fact that they are diverse and useful at demonstrating casual relationships among variables, which is some cases can be manipulated to measure the effect on other variables (Jackson, 2012). In a single case design, you have one individual or one group. Think about the reasons for which you might use only an individual to conduct a study.

    - Question 8. How does a multiple-baseline design differ from a reversal design? The reversal design only has one participant in which the independent variable is introduced and treatment is reversed on a number of times. In a multiple-baseline design reversing the treatment is impossible and the treatment and baseline conditions are introduced over multiple subjects multiple times.

2. Describe the advantages and disadvantages of quasi-experiments? What is the fundamental weakness of a quasi-experimental design? Why is it a weakness? Does its weakness always matter? The advantages of quasi-experiments include designs that foster single and nonequivalent randomly selected groups (Jackson, 2012). Quasi-experimental designs can also resemble quantitative and qualitative research, but lack the key component of random assignment groups, causing statistical analysis to be very difficult (Shuttleworth, 2008). Quasi-experiments can be considered field research

because it often involves research conducted in naturalistic environments (Jackson, 2012). Physical and biological scientists regard quasi-experimental designs as unreliable, because a fundamental weakness exists because casual relationships between variables cannot be conclusively established (Jackson, 2012). Nonetheless, quasi research methods are very useful for measuring social related variables, although weaknesses do exist. Jackson (2012) cautions that quasi-experimental research results should be interpreted with care due to single or nonequivalent groupings, alternative explanations, uncontrollable variables, and experiment design flaws. However, the inherent weaknesses in the research design do not undermine the validity of the results, as long as they are documented and permitted during the study (Shuttleworth, 2008). Good explanation here Michael.

3. If you randomly assign participants to groups, can you assume the groups are equivalent at the beginning of the study? No. At the end? No. Why or why not? No, because in many studies there is no guarantee that the experiment and control groups "are at all equivalent on any variable prior to the study" (Jackson, 2012, p. 348). Therefore, researchers cannot conclusively determine the manipulation of the variable is responsible for the outcomes. Jackson (2012) indicates that one possibility could be that the experiment and control groups were not equivalent from the start. For this reason, researchers cannot conclude that the outcomes recorded were due to the independent variable. If you cannot assume equivalence at either end, what can you do? Please explain. Researchers must do their best to select groups that are equivalent for the sake of designing a valid research study. However, no matter how much effort is put into the research design, researchers cannot definitively ensure that the experiment and control groups are equivalent (Jackson, 2012). The use of a true experimental research design is one way to ensure that the experiment and control groups are equivalent. The experimental method allows researchers to establish a cause and effect relationship through manipulation of a variable and controlling the membership of the experimental and control groups (Trochim & Donnelly, 2008). Additionally, conducting research in a laboratory setting enables researchers to maximize control over the variables and groups of the study (Jackson, 2012). There are statistical control methods that can be used as well…..the analysis of covariance.

4. Explain and give examples of how the particular outcomes of a study can suggest if a particular threat is likely to have been present. Regression of the mean is one particular outcome scenario that may suggest a threat to internal validity. This happens when [1]scores recorded within a study could have been a result of chance or luck (Jackson, 2012). Another example of how the particular outcomes of a study can suggest a threat is experimenter effect. This type of threat happens when "results from a study are biased by the experimenter's expectations" (Jackson, 2012, p. 233). Finally, when random sampling and random assignment is not used this creates a nonequivalent control group to which a quasi-experimental design is more appropriate to decrease the threat to internal validity (Jackson, 2012).

5. Describe each of the following types of designs, explain its logic, and why the design does or does not address the selection threats discussed in Chapter 7 of Trochim and Donnelly (2006):
    1. Non-equivalent control group pretest only – is a research design that includes two groups, the control and experiment, where the control group is added for comparison. According to Trochim and Donnelly (2008) the only threat to internal validity is selection-regression. Selection-regression happens when there are different rates of regression to the mean between the two groups (Trochim & Donnelly, 2008). Additionally, social interaction threats can affect internal validity when diffusion of treatment, compensatory rivalry, resentful demoralization, and compensatory equalization of treatment are present (Trochim & Donnelly, 2008).
    2. Non-equivalent control group pretest/posttest – is a research design that includes two groups that are given a pretest before the study and a posttest at the conclusion of the research study. According to Trochim and Donnelly (2008) there are several threats to internal validity, however one threat dominates all others, selection bias. Selection bias is any factor other than the treatment that leads to differences in posttest results between the two groups. Additional threats include: selection-history, selection-maturation, selection testing[2], selection instrumentation, and selection-mortality. Examples of external validity existing in the nonequivalent control group pretest only design are possible in pretest/posttest design (Trochim & Donnelly, 2008).
    3. Cross-sectional – A cross-sectional design is a study that happens at a certain point in time. Researchers study groups of individuals of different ages at the same time (Jackson, 2012). Jackson (2012) states that an advantage of this design is that a variety of ages can be studied in short period of time. A disadvantage is that comparisons can be made between groups, which are at different ages, different time periods, and across multiple generations (Jackson, 2012). Given this information, one threat to a cross-sectional design could be selection-history.
    4. Regression-Discontinuity – According to Trochim (2006) the regression-discontinuity (RD) design refers research design variations. It is a pretest-posttest comparison design strategy, in which research participants are pre-assigned to particular groups and conditions solely on the basis of a cutoff score (Trochim, 2006). Possible threats to internal validity include: selection-history, selection-maturation, selection testing, selection instrumentation, and selection-mortality. Examples of external validity existing in the nonequivalent control group pretest only design are possible in pretest/posttest design (Trochim & Donnelly, 2008).

6. Why are quasi-experimental designs used more often than experimental designs? A quasi-experimental design is a type of experimental research used considerably in education and social sciences (Jackson, 2012). Unlike true experimental designs, quasi-experimental designs incorporate a group comparison; involve selecting groups upon which a variable is tested, without any random assignments to the experimental group (Trochim, 2006). For example an educational experiment might be intentionally selected by alphabetical order, seating arrangement, or cognitive ability. The convenience of selection is often preferred, and in an educational situation, causes very little disruption to

the learning environment. After this selection, the experiments proceeds in a very similar way to any other experiment, with a variable being compared between different groups, or over a period of time (Shuttleworth, 2008).

7. One conclusion you might reach (hint) after completing the readings for this assignment is that there are no bad designs, only bad design choices (and implementations). State a research question for which a single-group post-test only design can yield relatively unambiguous findings. What are the specific performance outcomes of a mixed technology reading intervention program? Good question!

References

Jackson, S. L. (2012). *Research methods and statistics: A critical thinking approach*. Belmont, CA: Wadsworth Cengage Learning.

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